

LXVI.—*Report on a small Collection of Echinoderm Larvæ made by Mr. George Murray, F.R.S., during the Cruise of the 'Oceana,' in November 1898.* By E. W. MACBRIDE, M.A., D.Sc., Professor of Zoology in McGill University, Montreal.

ALL the larvæ which I found in the collection were *Bipinnariæ*, and, with the reservations made hereafter, they seem all to belong to the same species, viz. *Bipinnaria asterigera* (Sars), which is the larva of *Luidia Sarsi*.

In the synopsis of all the known species of *Bipinnaria* given by Mortensen ('Die Echinodermenlarven der Plankton-Expedition') two species are distinguished from all the rest by the great elongation of the præoral lobe, or part of the body in front of the mouth, which is bifurcated at the tip into two processes, one belonging to the præoral and one to the postoral band of cilia. These two species are believed to be the larvæ of *Luidia Sarsi* (*Bipinnaria asterigera*) and of *Luidia ciliaris* respectively. The first of the two species is discriminated from the second by the circumstance that the dorsal process of the præoral lobe is longer than the ventral and is heart-shaped, being marked on the border by a median indentation.

All the specimens which are in good enough condition to permit of the determination of these points belong unequivocally to *Bipinnaria asterigera*. Many of them show most distinctly the disk of the future starfish, but in several this is not yet developed. All specimens of *Bipinnaria asterigera* hitherto described have been late larvæ with a well-developed starfish disk; in this collection, for the first time so far as I am aware, the younger stages have been recorded. Where the lateral and posterior processes of the ciliated rings are preserved they are exceedingly long, so as to deserve the name of tentacles; but in many specimens they are mutilated, owing possibly to the shaking up they received on their trans-Atlantic journey.

Garstang, it is true ("Some *Bipinnariæ* from the English Channel," Quart. Journ. Micr. Sc. vol. xxxv.), described a young *Bipinnaria* which Mortensen considers to be probably a young stage of *Bipinnaria asterigera*. This I consider possible, but not probable, for the dorsal process of the præoral lobe is described by Garstang as lanceolate in outline, whereas the youngest specimens of *B. asterigera* in the present collection in which there is not as yet a trace of the

disk of the future starfish have in each case a heart-shaped dorsal process on the præoral lobe.

In the case of two or three of the specimens submitted to my inspection the præoral lobe had been so injured that it was not possible to be certain as to its shape; but, except in one case, the other characteristics left no doubt in my mind that these larvæ were also to be regarded as *B. asterigera*. In the case specially referred to—the only larva recorded in haul 5 (see below)—there was a well-marked five-rayed disk and a very long præoral lobe; but the processes were shorter and the whole larva decidedly smaller than the typical full-grown *Bipinnaria asterigera*. The only other species of *Bipinnaria* so far known which possesses such a long præoral lobe is the larva of *Luidia ciliata*, and this is at once distinguishable by the fact that the starfish disk which it bears is seven-rayed. On the whole I conclude that this somewhat aberrant larva is also to be regarded as *Bipinnaria asterigera*. Dwarf larvæ are not of uncommon occurrence in other species of Echinoderms (I have met them in *Asterina gibbosa* and in *Echinus esculentus*).

Subjoined is a list giving the contents of each haul as submitted to me:—

Haul 1.—Lat.  $52^{\circ} 4'5''$  N., long.  $12^{\circ} 27'$  W. Depth 270 fathoms. Net 2 *b*.

One damaged specimen of *Bipinnaria asterigera* with no trace of the starfish disk.

Haul 2.—Same place and same depth. Net 2 *c*.

Several full-grown specimens of *Bipinnaria asterigera* with a large disk; one with rudimentary disk.

Haul 3.—Same place and same depth. Net 2 *e*.

Two young *Bipinnaria asterigera*; the starfish disk not yet formed.

Haul 4.—Same place. Depth 620 fathoms. Net 2 *f*.

Several *Bipinnaria asterigera* with far-advanced starfish disk; one or two younger stages without disk.

Haul 5.—Lat.  $52^{\circ} 4'5''$  N., long.  $11^{\circ} 20'1''$  W. Surface. Net 1 *a*.

One aberrant larva with five-rayed disk (see above).

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